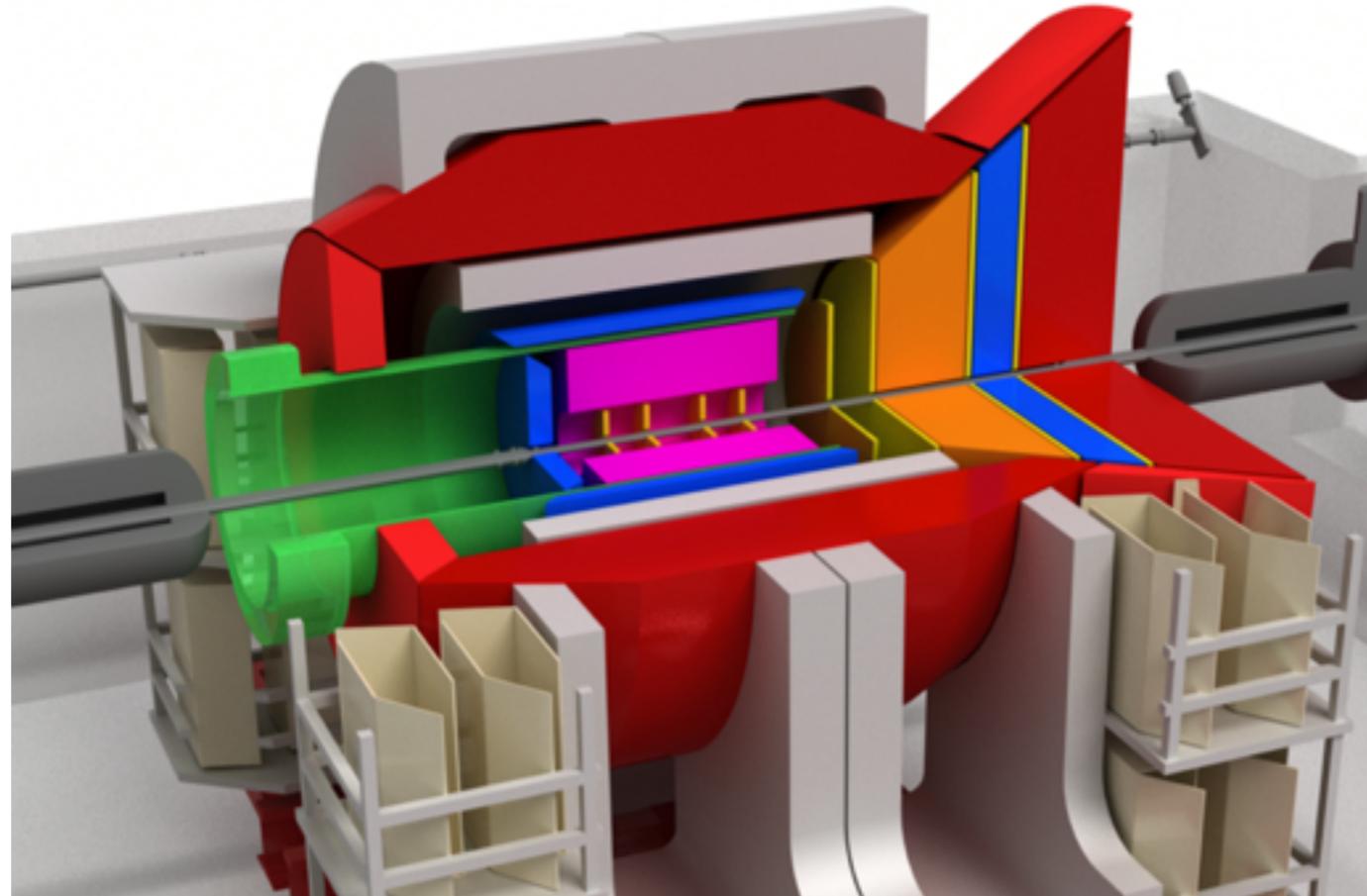




Stony Brook University



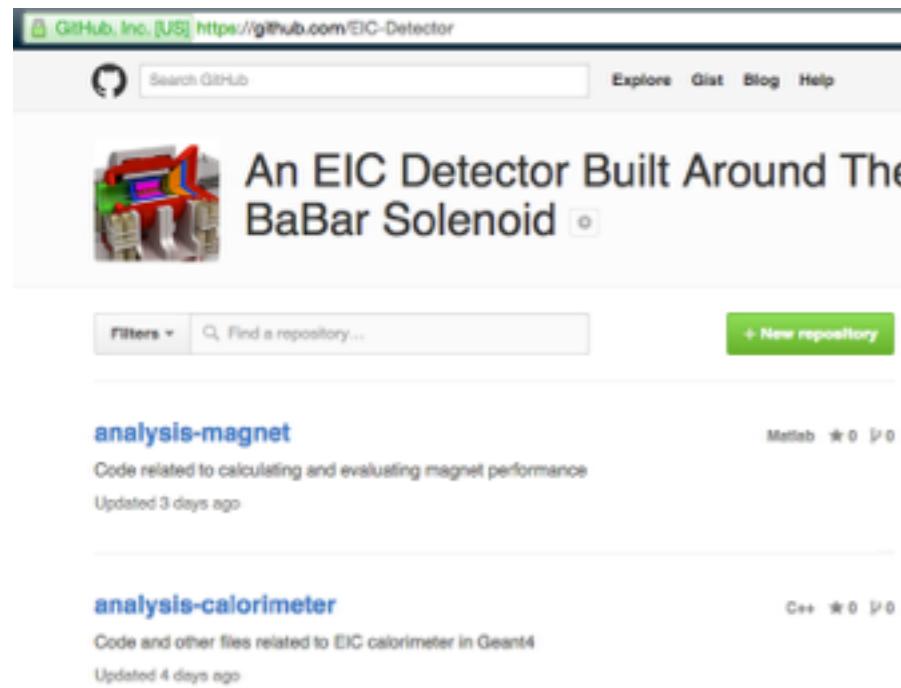
Software News & SBU Student Projects Summer 2015

Nils Feege

Joint fsPhenix / EIC Detector Meeting, May 19 2015

EIC Detector Software on GitHub

<https://github.com/EIC-Detector>



- ❖ **coresoftware-eic**
Additional Fun4All libraries and macros
for full EIC detector simulations

- ❖ **analysis-calorimeter, analysis-pythia, ...**
Analysis-specific code, macros, and more.

Check out: **Public**
Commit: **Restricted**

Have an analysis macro? Please share!

RCF Space for EIC Simulations

`/direct/phenix+sim02/phnxreco/ePHENIX/`



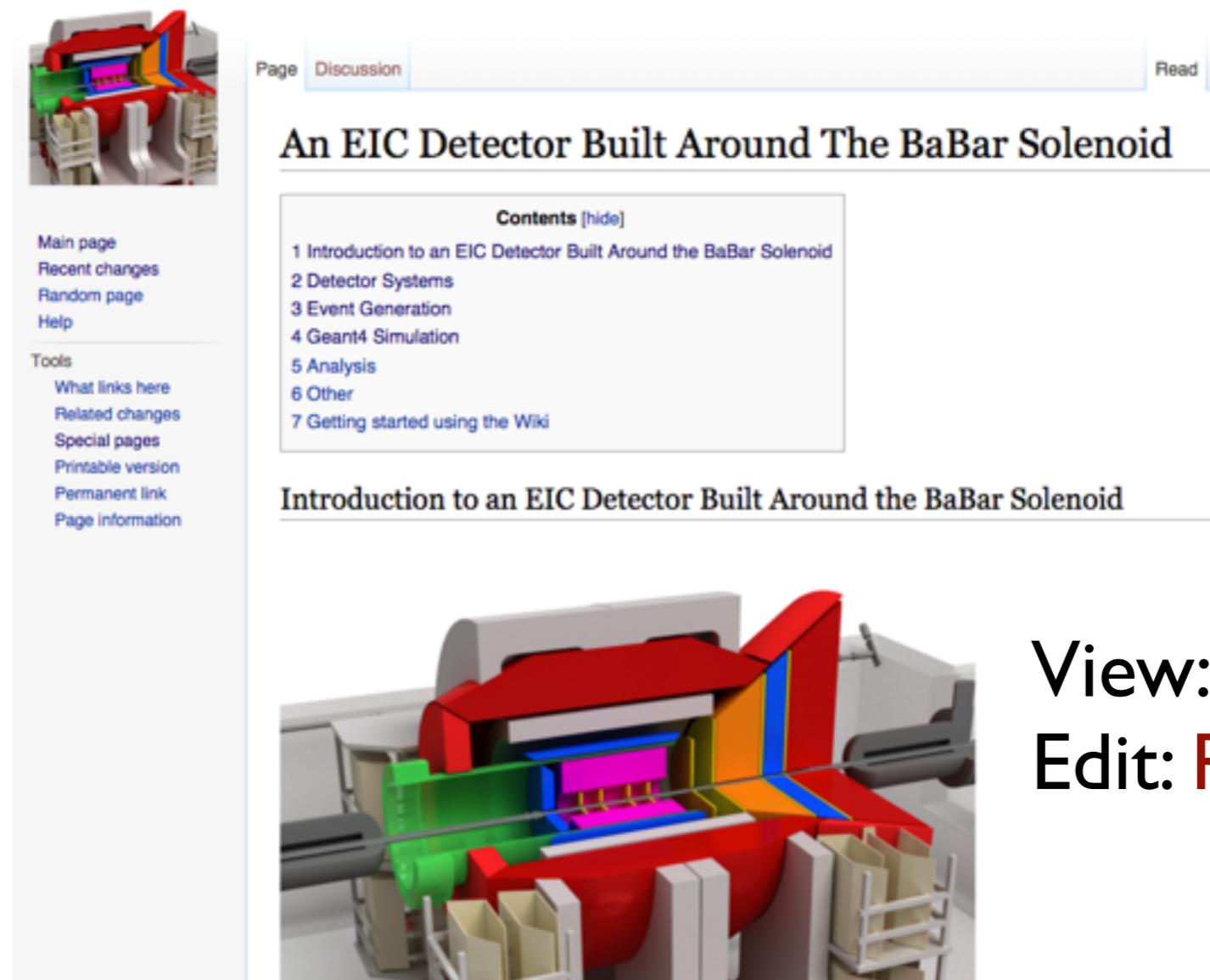
Pythia e+p files already available:

5 GeV x 100 GeV

10 GeV x 250 GeV

15 GeV x 250 GeV

A New Place for EIC Detector Simulation and Analysis Wiki



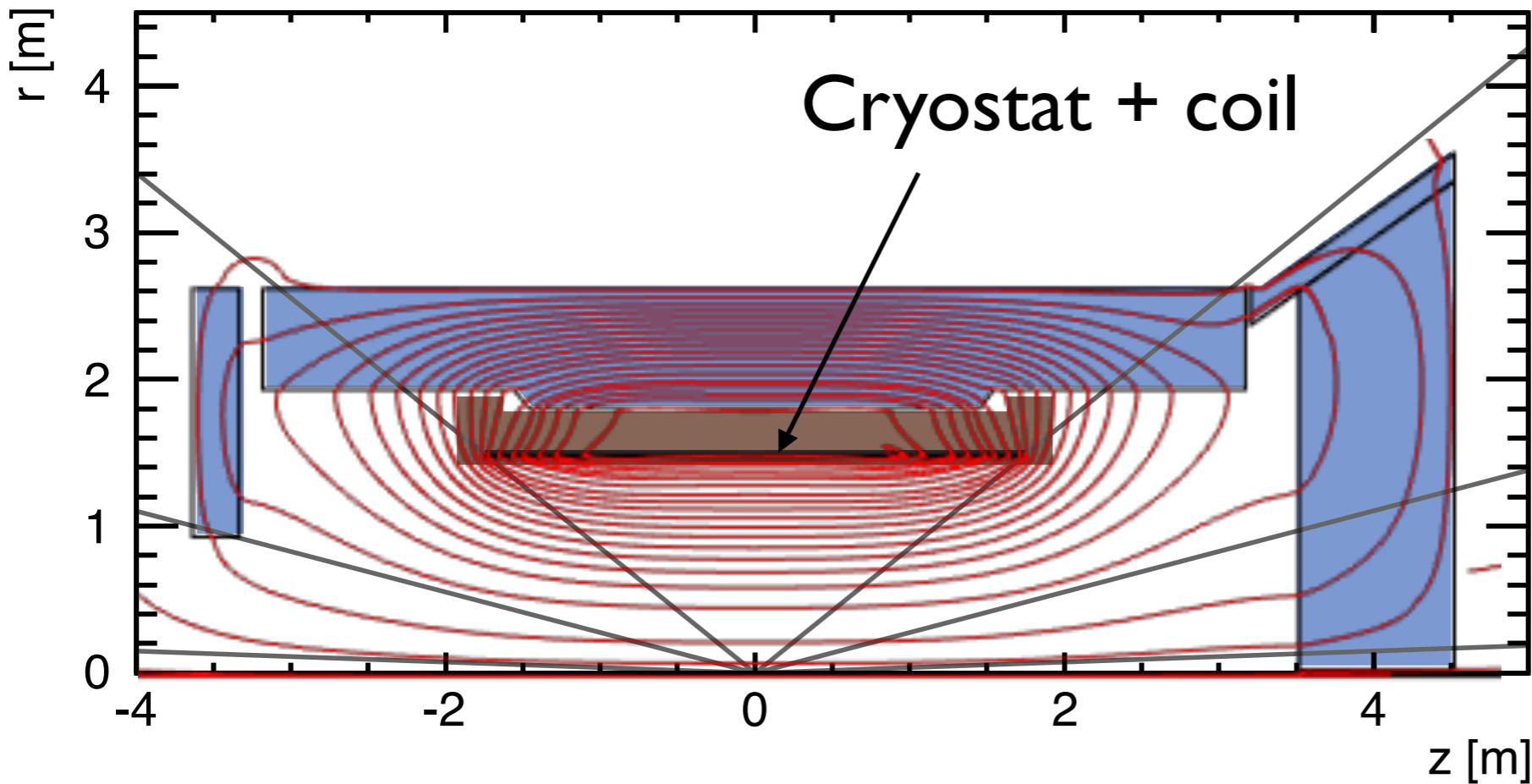
The screenshot shows a Wikipedia page with the following structure:

- Page Header:** Page Discussion Read
- Image:** A 3D rendering of the EIC detector, showing its complex internal structure built around the BaBar solenoid.
- Page Title:** An EIC Detector Built Around The BaBar Solenoid
- Contents:** A sidebar with links to the main page, recent changes, random page, help, tools (what links here, related changes, special pages, printable version, permanent link, page information), and a contents section with numbered links to various parts of the article.
- Text:** Introduction to an EIC Detector Built Around the BaBar Solenoid
- Image:** A larger 3D rendering of the EIC detector's internal components, including the red solenoid and various detectors.

View: Public
Edit: Request account

<http://zwarg.physics.sunysb.edu/mediawiki/eic/>

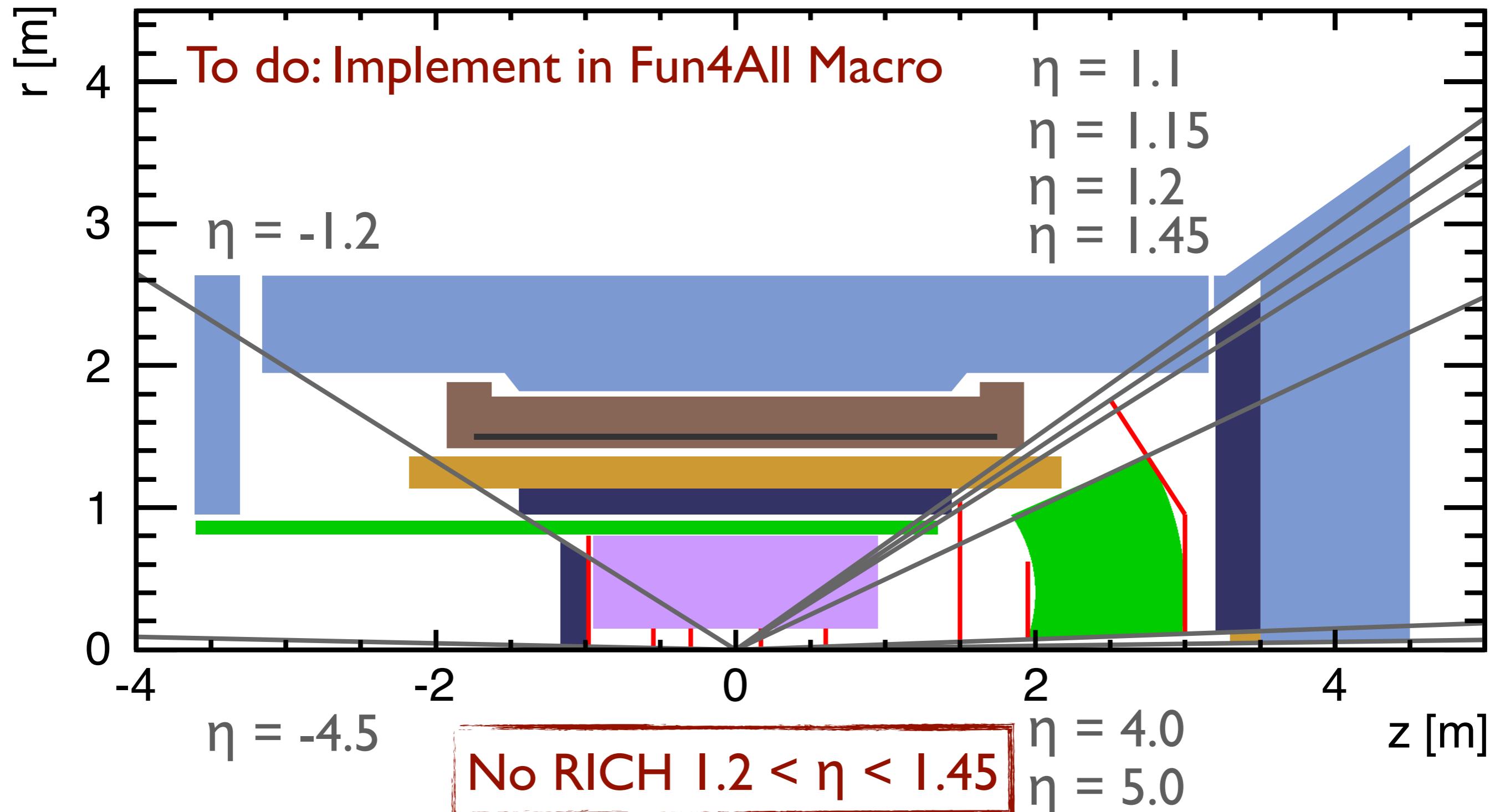
COMSOL Magnetic Field Calculations



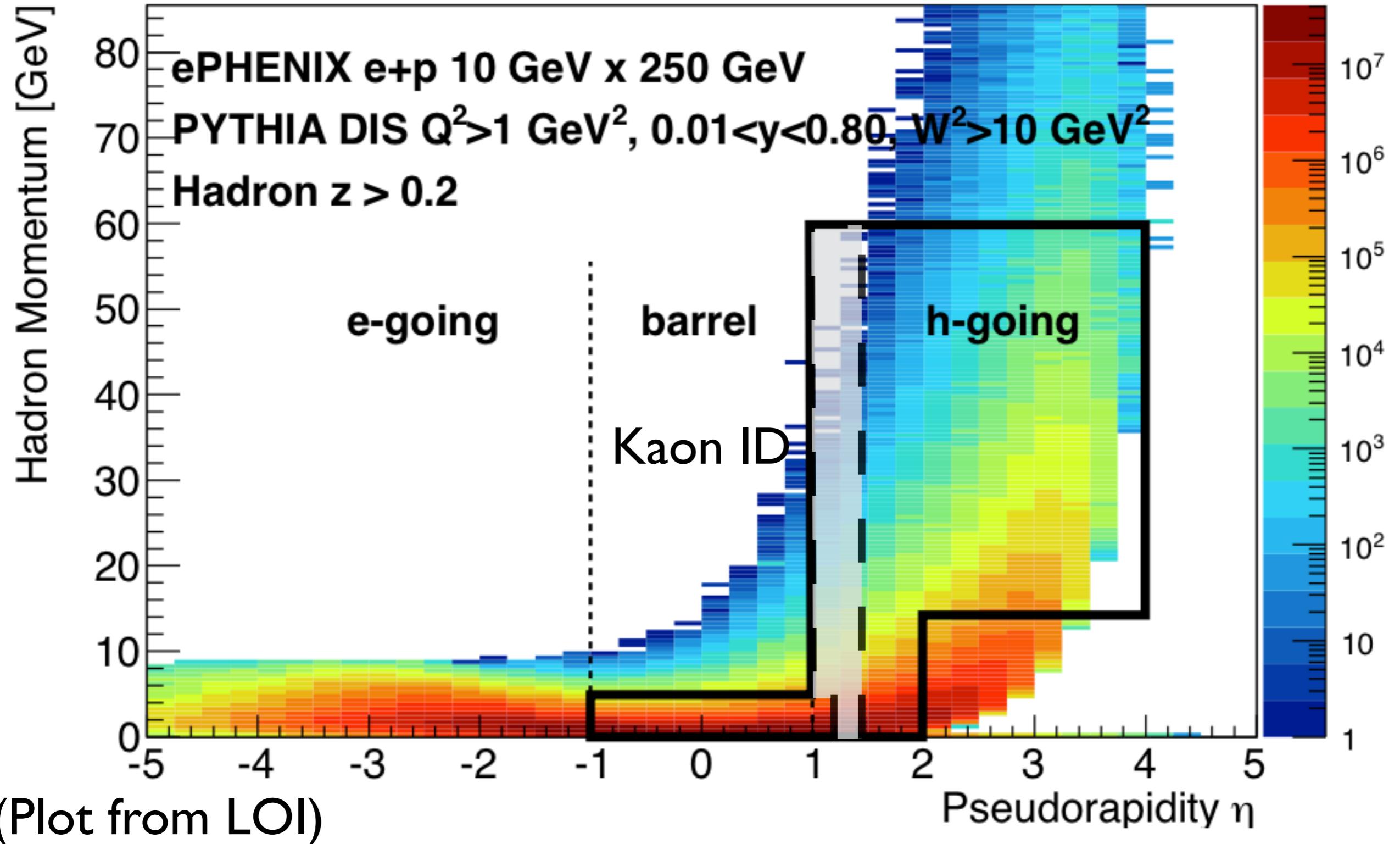
Convergence of
FEM calculations?

- COMSOL crosscheck with MatLab calculation (Coil only)
- COMSOL crosscheck with POISSON (Coil + yoke)
- Provide full field map
- Provide full field map with Hipperco-50 piston

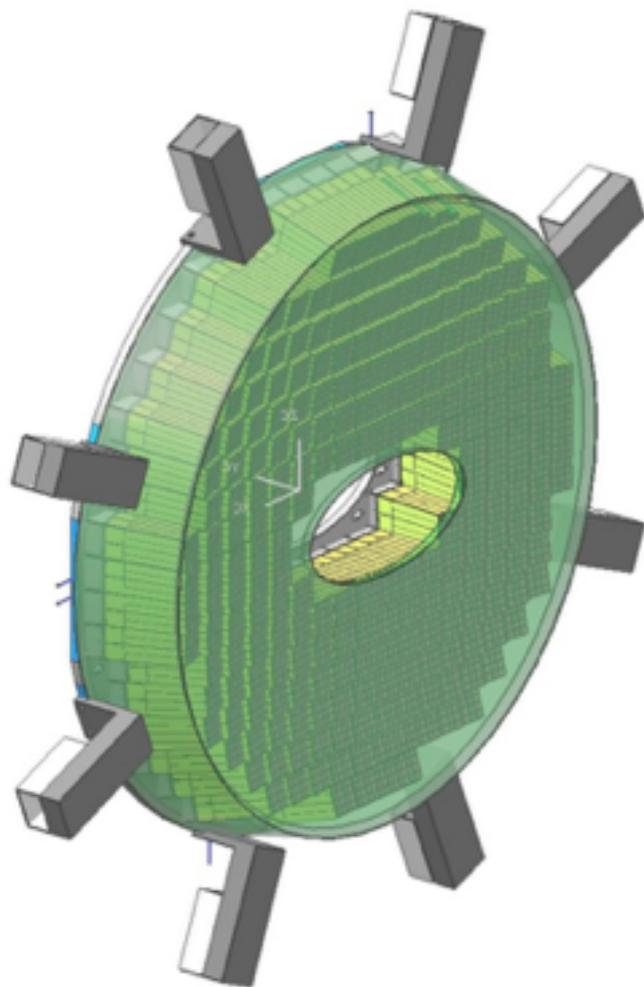
Geometry Updates



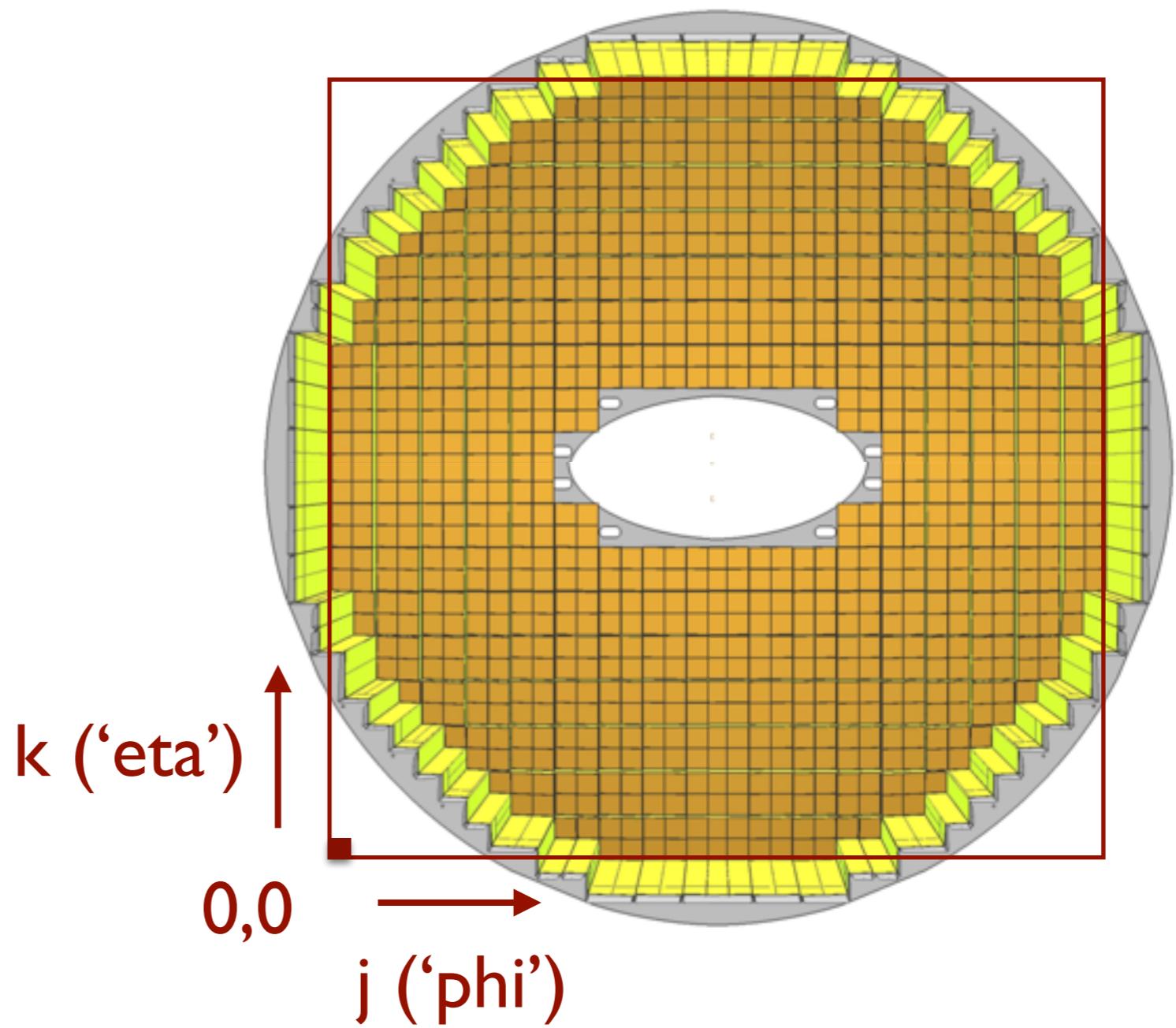
Reduced PID Coverage



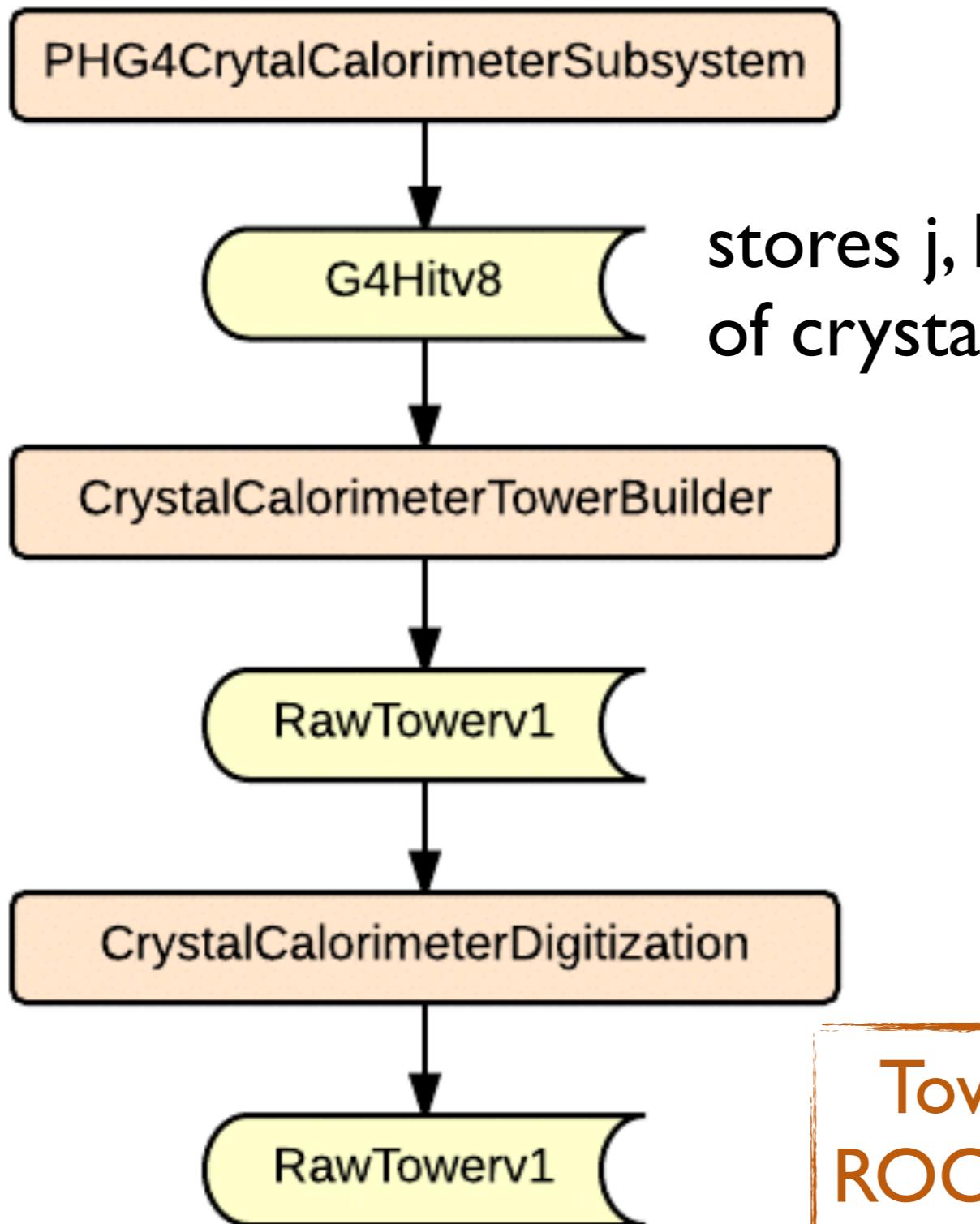
Detailed Crystal Calorimeter Implementation in Geant4



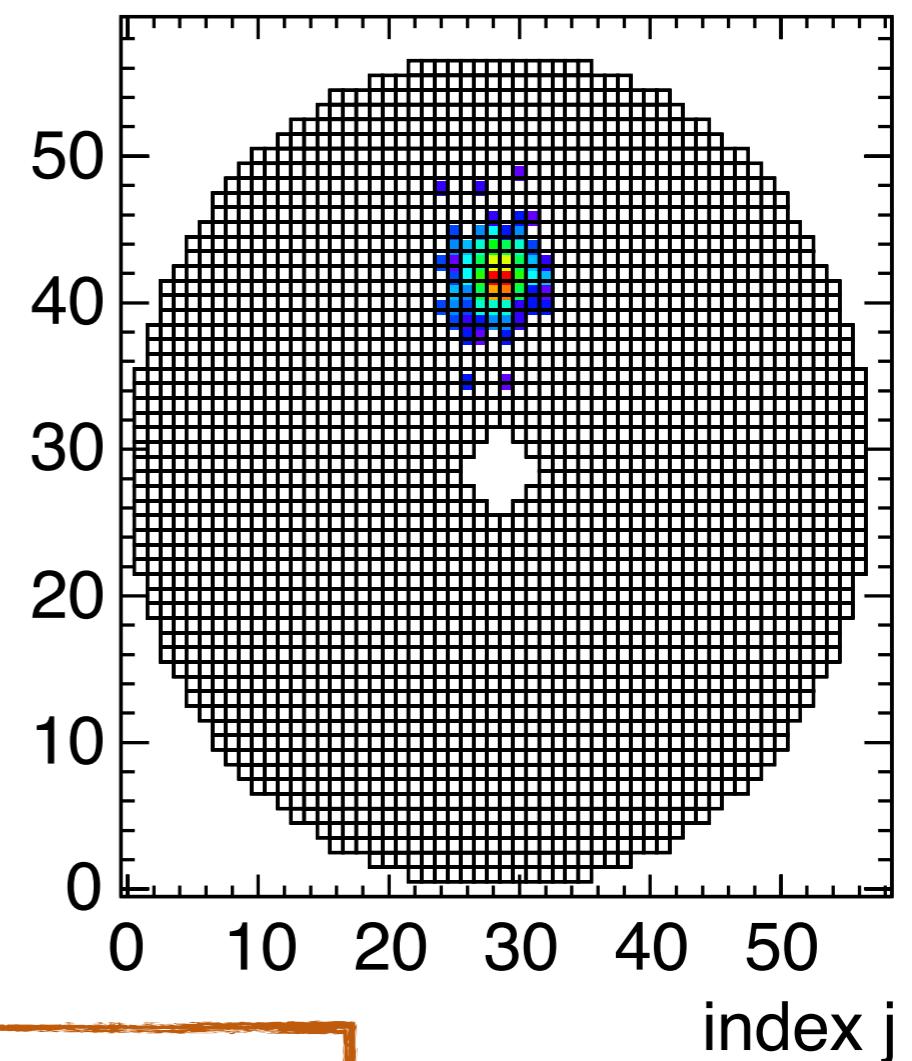
G4Hitv8 stores
index j, k of crystal



Crystal Calorimeter Data Flow



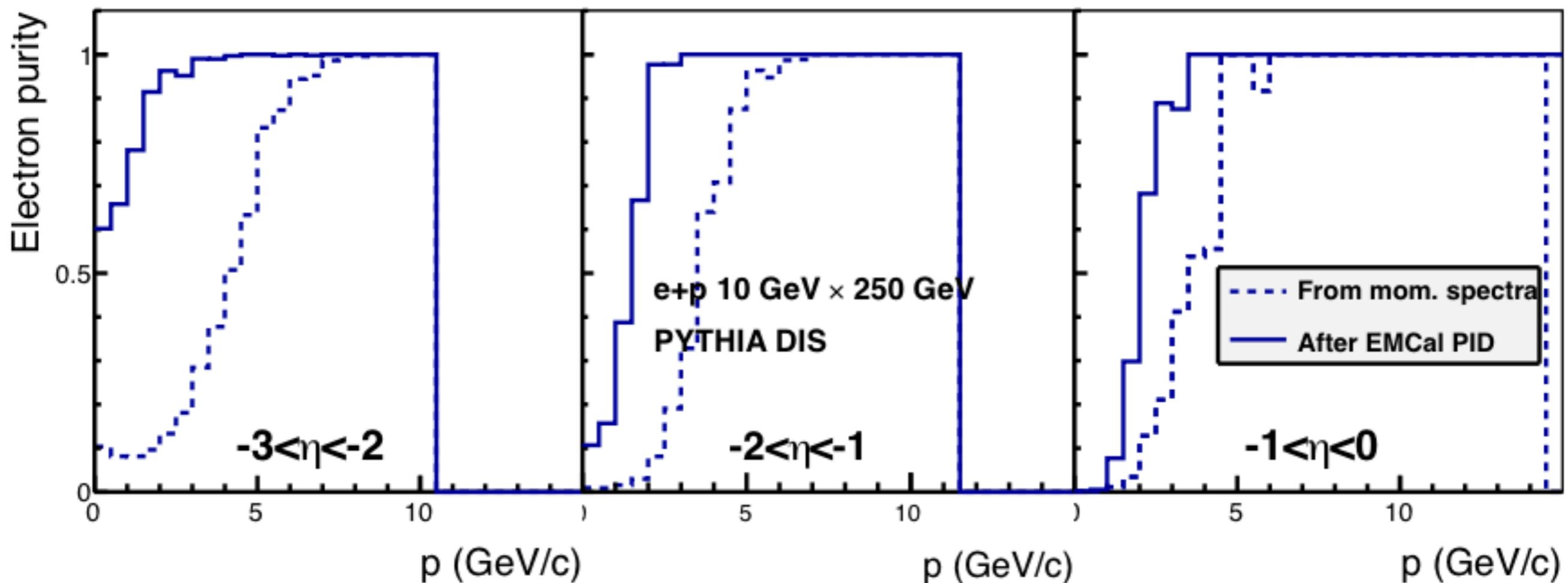
I electron, 10 GeV,
 $\eta = -2.0$



Tower geometry?
ROOT::TGeometry?

Goal: Quantify e-pi Separation with GEANT4 Simulation

Need tracking!



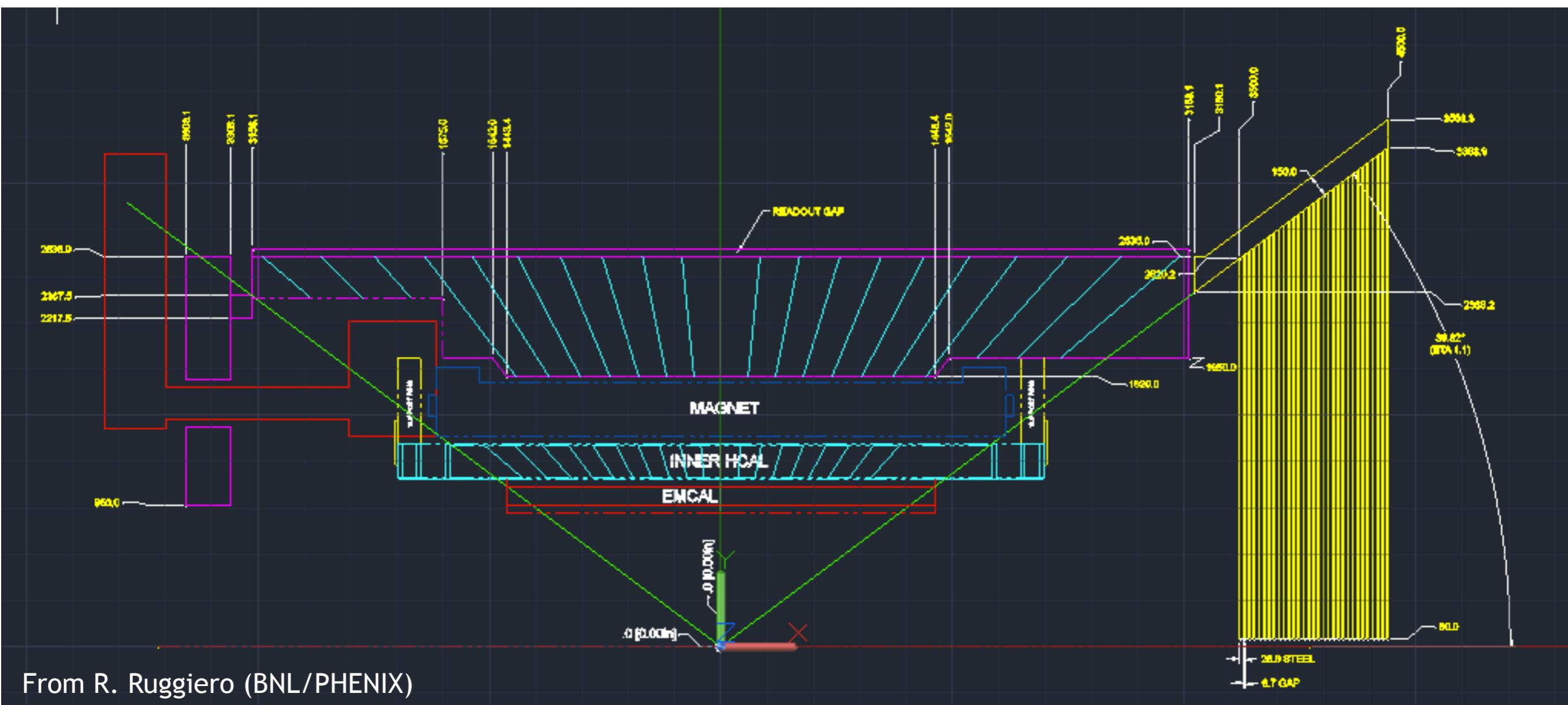
(arXiv:1402.1209v1): parametrization

SBU Summer Student Projects

- ◆ Magnet simulation (Dhananjay R.)
- ◆ Pythia: Repeat some Lol studies with new detector acceptance and at different beam energies (Thomas K.)
- ◆ Crystal Calorimeter tower geometry implementation and e/pi separation in e-going and center calorimeter for DIS events (Joshua L.)
- ◆ Tracking in forward / backward direction with inhomogeneous fields using Kalman Filter (N.F. + ?)
- ◆ Leptoquark analysis? (Need FULL EIC detector simulation, digitization, ...!)

ADDITIONAL SLIDES

An updated mechanical design for EIC Detector / fsPHENIX



From R. Ruggiero (BNL/PHENIX)